any obstruction rendered gastrojejunostomy necessary at a later period.

Acting on this observation, we have four times produced the condition of perforation by cutting out the crater of the ulcer and closing the defect by suture. The results have been good, but sufficient time has not elapsed to know if it will be permanent; but it is a much easier and safer operation than the excision of the entire indurated and cicatricial area about the ulcer which we have heretofore practiced. The extensive operation, however, would be indicated if there was any evidence of malignancy, which, as we have already pointed out, is less liable to take place in ulcer of the duodenum than in ulcer of the stomach.

Chronic protected perforation occurred 37 times. In the chronic form, unlike the acute form, incomplete perforations with adhesions protecting the base of the ulcer seemed to act as an aggravation to the condition, and recurring attacks of local peritonitis were the rule, often producing symptoms resembling those of gallstone disease, for which the manifestations were sometimes mistaken.

A marked peculiarity of duodenal ulcer is the periodicity of the attack, beginning as a rule in early adult life. The subject, usually a male, has an attack of stomach trouble, of which acidity is a prominent feature. This lasts a few days or weeks and is followed by an "almost well" periods of weeks or months. These symptoms recur with increasing frequency, the patient finding some relief from a restricted diet. In the later stages mechanical obstruction often appears. Hemorrhage occurs in about one-half of the cases.

A differential diagnosis between gastric and duodenal ulcer can usually be made. In duodenal ulcer the pain and tenderness, as a rule, extends from the mid-line to the right; aggravation induced by food comes on several hours after a meal, and the patients suffer from a peculiar "hunger pain" when fasting.

Unlike gastric ulcer, duodenal ulcer rarely undergoes carcinomatous degeneration. We have seen but four apparently primary carcinomas of the duodenum. In two of these the origin was uncertain, and in but one did it seem probable that the cancer had developed on ulcer. In five cases, however, we have known gastric cancer to develop on the edge of a duodenal ulcer which involved the stomach at the pyloric ring.

The surgical treatment of chronic duodenal ulcer will usually consist of gastrojejunostomy, preferably by the "no loop" method.

We have made 311 gastrojejunostomies for ulcer of the stomach and duodenum by this particular method, with a mortality of less than 1 per cent., and but three patients have required a secondary operation on the stomach or duodenum for any cause.

If the ulcer has caused hemorrhages we tie the blood vessels leading into it, and with sutures cover with sound tissue (Fig. 2). Should there appear to be any danger of perforation, the site of the ulcer is covered in the same manner as recommended by Mr. Moynihan, who calls attention to the possibility of secondary perforation.

In four cases we have excised the ulcer with direct union to the stomach. This did not prove a very satisfactory procedure, as in two of them we were compelled to do gastrojejunostomy later. In several of the cases, however, we were able to excise the ulcer and close by plastic repair after the Finney plan with good results.

In one case an obstructing ulcer of the duodenum an

inch and a half below the pylorus so angulated the duodenum on itself that it was comparatively easy to do duodeno-duodenostomy between the first and second portions of the duodenum. Figure 3 is from a drawing of an hour-glass duodenum, the result of ulcer, which was cured by resection with end-to-end union.

In this connection I wish to again call attention to Figure 1. The arrangement of the blood vessels of the duodenum just below the pylorus are such that if the pyloric end of the stomach is pulled upward rather firmly, as one must often do to obtain a view of the parts, an anemic spot will appear in the duodenum just below the pyloric ring. This appearance is at times very striking and may closely resemble an ulcer. On one or two occasions we were obliged to incise the duodenum at this point before we could be certain that no ulcer existed. The tissues apparently involved are normal to the feel and do not have the milky appearance of the peritoneum of true ulcer, and there are neither adhesions nor other abnormality. If the traction is taken off, it will be seen at once that no ulcer exists.

There has been much discussion as to the curative value of operation for ulcer. From our own experience we can say that the surgical treatment has been most satisfactory. The small esteem in which surgery of the stomach and duodenum is held by many professional men, and the bad results reported, have been largely due to mistakes in diagnosis and unnecessary operations performed where no ulcer existed.

We have, as far as possible, traced our patients with duodenal ulcers operated on in 1906-7. These two years were chosen because this choice eliminated some of the early operations in which the diagnosis was doubtful and the technic imperfect, and it prevented the inclusion of the recent cases that the shortness of time since operation would render valueless to statistics from the standpoint of cure.

Of the 119 patients operated on in 1906-7, we have information of 106. Of these 87, or 82 per cent., were cured; 10, or 9.5 per cent., improved; and 6, or 5.7 per cent., unimproved, making cured and improved 91.5 per cent. The operative mortality in the whole number of cases was 2.8 per cent.

THE DIAGNOSIS AT OPERATION BETWEEN CHRONIC ULCER AND CANCER OF THE STOMACH.*

F. B. LUND, M.D.

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In my experience with gastric surgery, although not extensive, I have been confronted with difficulty in deciding in certain cases between the presence of benign and malignant disease, a decision so important and at the same time so difficult that the subject seemed to me worthy of consideration.

The past decade has been one of great activity in the surgery of the stomach. The work has been prosecuted with marked interest and zeal, and, on the whole, with commendable sanity and judgment. Nevertheless, it can not be denied that, as has been inevitable in any new department of surgical endeavor, we have had to feel our way by constant experiment and modification. Mistaken methods have been tried and found wanting; ex-

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cellent procedures have been misapplied, and it is only recently that we have reached firm ground in such important points as the best method of gastroenterostomy and the technic of resection in cancer. There can be no doubt in the minds of those who have followed the work in this field closely that in the early days many operations were done which in the riper experience of the present day would not be deemed good judgment, that gastroenterostomy was done with poor results in such conditions as neurasthenia accompanying gastroparesis, in hemorrhage from medical (acute) ulcer, and other conditions, which experience has taught us to-day, are best not operated on. Medical or acute ulcer, with or without hemorrhage, ptosis attended by neurasthenia, and all non-obstructive lesions of the stomach, except chronic ulcer and cancer, have been practically eliminated from the surgery of that organ. Hour-glass stomach due to contraction of the scar of a chronic ulcer, or to adhesions, is, of course, classed among the obstructive lesions.

British and American surgeons have contributed in no small degree to the rapid advancement of our knowledge of this subject, and among those who by example and precept have been foremost in this field I need only mention such names as those of Robson and Moynihan¹ in England, and the Mayos, Rodman, Finney² and Munro³ in this country.

In regard to cancer of the stomach, there can be no doubt that in operable cases, which means those cases in which the growth with a fair margin of stomach and the involved glands can be removed, the only treatment which gives any promise of relief is in excision, and from my own experience, though small, I am glad to be able to corroborate the statement of Mayo that cancer of the stomach is as amenable to treatment as is cancer of the breast. It is not, however, with the plain unmistakable cancers of the stomach that I wish to deal in this paper, but with those cases—and they are not rare—in which even after all preliminary methods of diagnosis have been exhausted and with the abdomen opened and the ulcer under the eye and touch, we can not distinguish between a chronic ulcer and a cancer. If the treatment justified were in both conditions the same, the fact could make no difference. In fact, no less an authority than Finney makes the statement that in all operable chronic ulcers gastrectomy should be performed, owing to the fact that they are indistinguishable from cancers, and gastrectomy rather than local excision is the best treatment for chronic ulcer.⁴

Perhaps we may come to accede to this statement, in so far as it is applied to nonadherent ulcers so situated as to be easily excised, such, for instance, as saddle ulcers on the lesser curvature; but there is another class of cases, in chronic ulcers on the posterior surface and at the pylorus and extending into the duodenum, when the determination of malignancy is of greater importance. In fact, it seems to me that these cases fall into two distinct classes, namely, (a) saddle ulcers of the lesser

curvature; and (b) ulcers at the pylorus extending onto or from the duodenum and adherent to liver or pancreas.

Cases of the second class are not inoperable, by which Dr. Finney evidently means incapable of excision, but their excision is difficult and attended by a risk which we should be willing to accept in cases of malignant disease but not in the treatment of simple ulcer, especially when we consider the many reported cases of simple ulcers in this situation cured by gastroenterostomy. Robson goes so far as to say that in adherent ulcers at the pylorus, even when they are greatly thickened and there is a suspicion of malignancy, gastroenterostomy should be performed, and he refers to a number of cases in his experience in which this procedure has proved curative. His experience is confirmed by many others.

Anatomic as well as clinical evidence of the cure of these patients is not wanting, from second laparotomies and occasionally from autopsy, as in Hoffmann's patient who died of strychnin poisoning two years after a gastroenterostomy for indurated ulcer at the pylorus, in which the autopsy showed a smooth scar, the ulcer having completely healed.

Hoffmann,⁵ however, while presenting the well-known advantages of gastroenterostomy over excision in most cases, states that if appearances at operation strongly suggest malignancy, resection should be done. He applies this statement to indurated ulcers, both at the pylorus and on the lesser curvature. He reports 52 cases of benign disease of the stomach from the Graz clinic.

Von Eiselsberg,⁶ speaking of stenosis of the pylorus, advises gastroenterostomy, but admits that in many cases it is difficult to decide whether an ulcer or a carcinoma is present, and states that under these circumstances, if the patient is strong enough, excision should be done. He reports in this paper thirty-nine gastroenterostomies for benign pyloric stenosis with one death, and eleven resections for benign disease with two deaths.

Hochenegg (Schulz⁷) performed gastroenterostomy in two cases in case of doubt, one because the patient was in poor condition, the other because of adhesions. Both patients did well at first, but died within twelve months after operation, and in one an autopsy showed cancer developing on an ulcer base.

On two occasions, however, I have subjected patients with chronic ulcers at the pylorus and extending onto the duodenum to a difficult and tedious excision, only to find that the ulcers were non-malignant. Although both patients recovered, one died four months later from contraction of the new stoma, which, owing to the length and difficulty of the operation, had been made by a Murphy button; this length of the operation was partly due to the fact that the common duct was accidentally divided and had to be reimplanted in the duodenum. It is in this class of cases that laboratory studies are of greatest importance and therefore should always be made before operation. In these cases of adherent ulcer, in which the question of excision is a delicate one, the presence and amount of free hydrochloric acid may aid in the decision, and so far in my cases has proved a good guide.

1. Moynihan, B. G. A.: A Review of 59 Cases of Cancer of the Stomach Treated by Operation, *Tr. Clin. Soc. Lond.*, 1906, **xxxix**, 84-95.

2. Finney, J. M. T., and Friedenwald, I.: Unusual Case of Ulcer of the Stomach, *Boston Med. and Surg. Jour.*, 1907, **civl**, 393-395.

3. End Results in Benign Lesions of the Stomach Surgically Treated, *Am. Surg.*, 1907, **xiv**, 818-826.

4. A parallel example of the induration due to chronic subperitoneal inflammation simulating malignancy may be found in those tumors of the cecum which by their stony hardness and appearance so simulate carcinomata, and which disappear so quickly after an inflamed appendix has been removed from among their adherent coils.

5. Haben wir in Zukunft günstigere Resultate von der chirurgischen Behandlung des Magencarcinomes zu erwarten, und besteht ein Zusammenhang zwischen klinischer Krankheitsdauer, und radikaler Operabilität? *Mitt. a. d. Grenzgeb. d. Med. u. Chir., Gedenkbund, v. Mikulicz*, 1907, pp. 879-892.

6. Die chirurgische Therapie des Magenulcus. *Mitt. a. d. Grenzgeb. d. Med. u. Chir.*, 1906, **xvi**, 1-18.

7. Zur Statistik der Gastroenterostomien bei benignen Magen-erkrankungen, *Deutsch. Ztschr. f. Chir.*, 1906, **lxxxviii**, 494-552.

In regard to cases of the first class, the saddle ulcers of the lesser curvature, my experience has been different.

A gastroenterostomy for a supposedly benign saddle ulcer of the lesser curvature failed to cure one of my patients, who gradually failed and died in a few months, probably from extension of a gastric cancer; and an excision in a similar case of a supposedly benign ulcer, which was subjected to an immediate microscopic examination, showed the presence of cancer and enabled a more extensive excision to be performed at once, with the gratifying recovery of the patient. An excision of a saddle ulcer of the lesser curvature with a wide margin of stomach with enlarged glands thought to be a cancer and therefore dealt with radically, resulted also favorably to the patient. Another patient, in the hands of a colleague, who came under my observation, and on whom a gastroenterostomy was performed for a supposedly benign ulcer of the lesser curvature, had a recurrence of symptoms a year or two later, and a second laparotomy disclosed a cancerous peritonitis.

Recently a patient on whom I performed a gastroenterostomy for a chronic saddle ulcer of the lesser curvature three years ago, excision being impracticable on account of adhesions to the liver, came to autopsy, and examination showed a cancer. In this case, undoubtedly, a cancer developed on an ulcer base, a condition to the frequency of which attention has been so often called in recent years by Mayo, Graham and others, and one which is a further argument for excision whenever possible. In these cases the presence or absence of hydrochloric acid has been an unsafe guide, and I believe these ulcers should all be excised, regardless of laboratory findings.

It is useless further to multiply examples which might demonstrate our inability to distinguish cancer from chronic ulcer. The practical questions for us are: First, how near can we come to a diagnosis and what aids can we summon before and during operation? Second, the aids failing us, how are we to proceed under the variable and deceptive conditions met with during operations? Partly on one's own experience, guided, of course, by the written and spoken advice of others of perhaps greater experience than one's self, but after all chiefly by one's own personal opinion, must the question in each case be settled. An attempt to formulate the principles which should guide us may well be prefaced by a brief statement of the clinical pathology of the disease.

With the superficial medical ulcer which involves the mucous membrane only, frequently bleeds and often is the cause of pain, but is curable under judicious rest and feeding, we have not to deal. Whether such an ulcer heals under medical treatment or becomes chronic, i. e., surgical, depends on whether sufficient rest can be given the ulcer without starving the patient and leaving the general nutrition so poor that the tissues can not heal. I may remark in passing that now that the long periods of rectal alimentation (essentially absolute starvation) in the treatment of this disease have been given up, a practice which often exhausted the patient to a point where the tissues were so devitalized that healing could hardly be expected, and feeding almost from the first has been adopted, we shall probably find fewer chronic or relapsing ulcers to operate on. Food which gives the maximum of nutrition with the minimum of work to the stomach we have learned may be given almost from the first, and with careful diet and supervision after the acute symptoms have disappeared and the patient dis-

charged from the hospital, I believe we shall have less chronic ulcers develop. This is only one of the many beneficial results from the success in prescribing dietetic regimens which medical men are attaining, as the result of special attention and study, and which have already given such remarkable results in obesity, diabetes, etc.

To return, however, to the subject, the relapsing, chronic, or surgical ulcer invades the muscular layer of the stomach until a definite patch of varying size becomes converted into scar tissue, white, of stony hardness, and of varying thickness, according to the time it has existed. Such a scar has elevated indurated edges where the infiltrated, ulcerated mucous membrane surrounds it, the edges may be excavated, so that any one may be defied to tell by touch or inspection whether they are cancerous or not, and glands may be involved and also indurated, so as still further to simulate malignancy.

Of the two large saddle ulcers above referred to, which I excised and which looked almost exactly alike, one being simple and the other carcinomatous, the cancerous ulcer was the least indurated and least malignant looking of the two. Excision of a portion of the ulcer for pathologic examination is undesirable, because it complicates the technic, because of the time wasted in waiting for a report, and because of the danger in case of malignancy, of infecting the open wound with cancer cells.

Excision of the entire ulcer and immediate examination of the specimen may help, and, in fact, in my second case the report of cancer enabled a more extensive resection, with the happiest results. However, even this method may fail, for the pathologist may have to cut and examine several portions of ulcer before he arrives at a malignant part and the delay may be too great.

In doubtful cases two facts may help us: one, that cancer rarely starts from the duodenum, so that if the duodenum seems primarily involved the induration probably is benign; and second, that benign ulcer perforates early as compared with cancer. So that subacute perforation with adhesions to the liver or pancreas in a case early enough to be a doubtful one points toward benign disease. The very induration attending subacute perforation may be the reason for the simulation of malignancy, or, to put it differently, the very conditions which render excision difficult may point to its being unnecessary.

In the second group of cases mentioned above, in which I excised two moderately adherent ulcers of the pylorus and first part of the duodenum, the situation was as follows: The clinical evidence and laboratory tests, hyperacidity, presence of free hydrochloric acid, etc., pointed in both cases to chronic ulcer. The induration and thickening of the pylorus and first part of the duodenum was of such a character as to suggest malignancy. In one I had previously (four weeks before) performed a gastroenterostomy without relief and the growth had increased in size. I felt that both lesions were probably malignant and performed resections, made difficult and dangerous by pancreatic adhesions, only to have both reported benign. In the first case I should have allowed the facts that the clinical and laboratory tests pointed to a benign condition and that carcinoma of the stomach rarely arises from the duodenum influence me; and in the second case the same factors, plus the knowledge that the inefficiency of the gastroenterostomy was in part, because the lumen was too small or, in other words, a technical error. I performed Rodman's ideal

operation, excision of the ulcer area, but in the presence of adhesions which made excision rather dangerous, and in the face of the fact that the very ulcers which are most amenable to healing under gastroenterostomy are those of the pylorus. I think under ordinary circumstances a gastroenterostomy is to be preferred in such situations.

I have performed seventeen gastroenterostomies for indurated thickened ulcer at the pylorus, some of which were bleeding freely at the time of operation, with one death and with uniformly good results in sixteen cases; and also on three ulcers at the lesser curvature adherent to the liver (perforated chronic ulcers), with permanent cure.

Of seven cancers of the stomach in which I have performed partial gastrectomy, two patients died as the result of the operation, one of the deaths occurring many years ago before I was acquainted with modern technic, and the other in a case in which an excision was undertaken in the presence of too great glandular involvement, after gastrectomy and enucleation of large masses of glands around the common duct and pylorus, accompanied by considerable hemorrhage. All the other patients were benefited by the operation. The most extensive lesion was in an old man of 68, in whom two-thirds of the stomach was removed; he gained twenty pounds and lived in comfort for a year. The least extensive lesion was a cancer of the lesser curvature; the patient was only slightly relieved and died in seven months. One patient is alive and perfectly well two years after the operation and has gained forty pounds; one is alive and perfectly well eight months after the operation and has gained forty-six pounds. My colleague, Dr. Nichols, has a patient in whom two-thirds of the stomach was removed, and who is well two years later.

If I may add my three cases of partial gastrectomy for benign disease, we have nine cases with two deaths, and considering the reasons for those two deaths I feel that the operative risks are not great. If I can keep from taking desperate chances in inoperable cases I feel that my mortality rate ought to be good.

The comfort of the convalescence from the gastrectomy cases, both benign and malignant, has been remarkable. Both the Billroth No. 11 and the Kocher method have been followed, but the finer points of technic have been, in the main, those advocated by Mayo⁸ in 1906, which is, I think, a classic and for which we owe him a very great debt.

Such success as we have had in cancer cases emphasizes the importance of making an accurate decision in early cases, which are the very ones in which we can hope for most and perhaps may justify the writing of this paper. I am aware that I have suggested no certain method which will accurately decide for us in doubtful cases. No harm can be done by an attempt to set forth the principles which should guide us in making these very important decisions, and for this reason, and in the hope that the discussion may throw more light on the situation than I have done, I am emboldened to present this paper.

CONCLUSIONS.

In certain cases of indurated ulcer of the stomach the diagnosis between benign and malignant disease may be impossible, even with the abdomen opened. These are

the early cases, in which the diagnosis of early cancer is important, as enabling thorough removal.

These cases, broadly speaking, fall into two classes:

1. Indurated ulcers (usually of the lesser curvature), which are movable and free and may be benign or malignant. Here, even if the tumor is benign, gastroenterostomy is often unavailing, and partial gastrectomy should be performed. Excision here is easy and safe.

2. Indurated ulcers of the pylorus often extending from the duodenum and adherent to the pancreas or left lobe of the liver. These are usually benign; excision is difficult and gastroenterostomy is safe and should usually be performed rather than excision.

In Class 1 excision should be done regardless of laboratory findings. In Class 2 the laboratory findings are important and usually reliable.

The responsibility of leaving a tumor which may be malignant is so great, however, that all diagnostic aids should be invoked, and in case of doubt excision, though at some risk, may be performed. The surgeon must decide in each case whether the risk lies in performing excision or leaving a tumor which may be malignant.

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DISCUSSION.

ON PAPERS OF DRS. MAYO AND LUND.

DR. ALEXANDER HUGH FERGUSON, Chicago: I think there is no prominent surgeon in America to-day who would even dream of asserting that he never errs in making a diagnosis between carcinoma and chronic ulcer of the stomach. There are certain things, however, that we see and feel at the time of operation, irrespective of the history of the case before the patient comes to the operating table, which lead the surgeon to lean on one side or the other in his diagnosis of the border-line cases. For instance, one opens the abdomen and finds at once a large amount of straw colored fluid coming through the incision. It evidently is a case of neglected carcinoma, a very far advanced case. We do not very often open up the abdomen in such cases to-day, but we have in the past. If we see extensive adhesions and if we pass in the hand and feel them without feeling a tumor, the diagnosis is rather of inflammation that has disseminated itself and caused these adhesions to form. If, however, we find thick, continuous, friable adhesions between one viscus and another, between the stomach and the transverse bowel, between the stomach and the parietes or liver, then we may be sure that points to carcinoma. This, too, would be a very late and inoperable case. Often in the early case in which the tumor mass is movable we can not make a diagnosis even when the ulcer is seen and felt, for malignancy may be just beginning.

There are certain ways, however, in which we may proceed to determine what we have in hand, and that is to pass the entire hand into the abdomen, exploring the lymphatics and organs. The anterior surface of the stomach can be palpated with one hand, but when the posterior surface is to be palpated both hands must be used. By careful palpation we may be able to determine a tumor mass where we did not suspect it, located at some place in the stomach wall, that gave but meager symptoms or signs of such an advanced condition. When, however, it is in the pylorus, obstructive symptoms and signs tell whether it is carcinomatous or due to ulceration in a much earlier stage.

What does all this teach? It teaches that patients who suffer with gastric symptoms during the carcinomatous age ought to be explored early, because only by such early explorations can the pathologic condition be removed, and it is only of temporary use to do a gastroenterostomy.

DR. VAN BUREN KNOTT, Sioux City, Iowa: I take it that the differential diagnosis is not so important in these extremely late cases referred to by Dr. Ferguson as it is in the earlier cases, in which there is a large infiltrated area at or near the pyloric end of the stomach. It is well known that the preoperative diagnosis between carcinoma and ulcer of the

8. Technic of Gastrojejunostomy, *Ann. of Surg.*, April, 1906.

stomach is extremely difficult; in fact, it is one which we very frequently fail to make. Men of experience are equally well acquainted with the fact that the diagnosis at operation, with the abdomen open, is, in many instances, practically impossible. Finney last month reported two cases before the American Surgical Association, in which at operation, with the abdomen open, he was unable to decide whether he was dealing with a carcinoma or an ulcer at the pylorus. Frozen sections also often fail to determine whether the growth is benign or malignant. This is a striking instance of making a differential diagnosis under great difficulties. If it be true, as Dr. Mayo told us, in accordance with the statistics of many observers, that implantation of carcinoma on ulcer is found to occur in over half of the cases of ulcer of the stomach, it would seem that the differential diagnosis at operation between large infiltrated inflammatory growths at the pylorus, between benign and malignant growths so situated, is not important, because in cases amenable to radical operation we should be conserving the best interests of the patient by doing a pylorotomy or partial gastrectomy and cutting out the growth, thus doing away with the possibility of implantation of carcinoma or ulcer or a recurrence of the growth and troublesome symptoms.

The statistics of pylorotomy to-day are very much worse than those of gastroenterostomy. Every one has done a pylorotomy in cases in which a growth suspected of malignancy was removed and found to be benign, and every one has also had the experience of doing a Rodman operation for ulcer and finding that the mass removed was a tumor of a malignant character.

DR. PARKER SYMS, New York: Gastric and duodenal ulcers are so closely allied clinically and surgically that they may practically be considered to be identical. The pyloric part of the stomach is a common seat of ulcer, and the upper one and a half inch of the duodenum is the common and usual seat of duodenal ulcer. Of course, in this discussion we may leave out of consideration the superficial acute ulcers common in young women, and which may be treated properly by dietetic and hygienic means. We are considering the chronic, deeply-situated ulcers, the indurated ones that do not tend to get well; it is these ulcers that present the greatest immediate and remote dangers.

Every case of gastric and duodenal ulcer should be recognized and cured. Attempts to effect a cure by hygienic and dietetic means should be limited to a brief space of time, and in all cases in which symptoms persist and a recurrence takes place operative procedures should be resorted to because the results will be much better than if a so-called expectant or conservative treatment is employed, and because the dangers of an uncured ulcer in this region are too grave to be neglected. Cancer of the stomach is a disease which can hardly be cured when it can not be recognized without opening the abdomen; therefore, our only means of curing this disease is to operate at a time so early that the diagnosis could not be made by the usual method.

Other dangers of duodenal ulcer are perforation and hemorrhage. There is no question that the vast majority of cases of ulcer of the duodenum and stomach may be cured by gastroenterostomy, and the preferable method of performing the operation is the one described by Dr. Mayo. We must not, however, neglect the fact that the end results are yet to be determined, and the argument put forth by Rodman calling for pylorotomy and removal of the tissue which may later become cancerous is too strong to be neglected.

DR. N. B. LEGGETT, New York: I shall confine my discussion to the question of the function of the stomach in the presence of an open pylorus. The details which I am going to present are elaborated from the result of a series of experiments carried on at the Surgical Research Laboratory of Columbia University during the past winter. A gastroenterostomy was done on seventeen dogs, and by means of a simple probang devised by the laboratory student assistant, Mr. A. G. Sullivan, a "B. B." shot, after being attached to a strong linen thread, was introduced into the stomach of each. The probang consisted of a heavy piece of wire strong enough to reach from mouth to stomach and twisted at one end. The

other end was cast into a handle of lead. In use the string was threaded through the eye and the attached shot is brought up against the metal. The dog was then anesthetized, its mouth held widely extended and its neck straight. The probang and shot thus passed readily through the cardia. At this moment the handle, which was purposely made heavy and of lead, was sharply struck with a heavy metal instrument. The blow was transmitted to the shot, which flew off into the stomach, carrying the string with it. The probang was then withdrawn, a needle threaded to the string, passed through a fold in the base of the pharynx and there knotted. Two days later the dogs were killed with ether. Clamps were placed on the cardia, the pylorus and the intestine aboral to the stoma to prevent the string from slipping during the removal of the specimen. After hardening, the specimens were dissected, so as to show the position of the string as indicating the path taken by the bullet, and mounted.

There are obviously four ways in which the shot may travel, namely: first, through the pylorus and on down into the intestine past the stoma; second, through the pylorus and into the stomach by way of the stoma, namely, a direct cycle; third, through the stoma and into the intestine, the supposed normal course; fourth, through the stoma and back into the stomach, a retrograde cycle. All the stomata were made on the anterior aspect of the stomach. Of seventeen specimens studied, twelve were found to have the stoma within an average of 5 c.c.m. of the pylorus, while in five the stoma was located at the most dependent portion of the stomach. On account of the variation in size of the animals operated on, the actual distance from stoma to pylorus would not create a correct impression. Of the twelve stomata placed near the pylorus, in five, or 41 per cent., the linen thread passed through the stoma. In seven, or 59 per cent., it passed through the pylorus; in one of these, two strings were fed, one passing through the pylorus and the other through the stoma. The string passing through the stoma made two complete cycles. In two cases in which the string passed from the stomach through the pylorus and again into the stomach through the stomach, the cycle was complete, and in one case a string making an exit from the stomach via the pylorus made three complete cycles. In this case the stomach was greatly dilated. Of the five specimens in which the stoma was located at the most dependent point of the stomach, the position of seven strings was to be studied, because in one case three strings were fed. In this case two strings were found to have passed through the stoma, one making a complete retrograde cycle twice. The third string had passed through the pylorus, making one direct cycle. In the five cases, four strings were found to have passed from the stomach by way of the pylorus and three by way of the stoma.

A point of interest, because it suggested a possibility of obstruction from spur formation at the point of the stoma, was the fact that when the cycle was direct, namely, through the pylorus and back again into the stomach through the stoma, the stomach was found to be uniformly dilated. In an anterior gastroenterostomy the stoma is used almost as frequently if placed at the dependent point of stomach as if near to the pylorus. Roughly speaking, the unobstructed pylorus is used to transmit one-half of the shot swallowed, the remaining half passing through the stoma. Whether this proportion holds true for the semi-solid chyme can probably be determined by feeding string without shot.

DR. F. B. LUND, Boston: The problem of distinguishing between an induration due to chronic ulcer and that due to carcinoma is to determine between actual tissue growth and deposit by inflammation, as in appendicitis where the appendix, buried under an inflamed cecum, has given rise to appearances of malignancy and where recovery occurs after removal of the appendix. I have seen such cases of appendicitis where the cecum was excised on account of the simulation of malignancy. Dr. Mayo's statement that many pyloric ulcers are really duodenal ulcers is a help in the decision how to deal with these cases because duodenal ulcers rarely become malignant, while resection of movable ulcers anywhere in the stomach is simple and safe if one follows the technic he so well demonstrated for cancer of the stomach.

In perforating ulcers of the duodenum the tenderness is often over the appendix and not over the site of the perforating ulcer. I attribute it to the fact that the greatest tenderness is at the edge of the inflammation. Cases in which a perforating ulcer of the duodenum was mistaken for appendicitis are the cases in which the starvation treatment never produces a cure, so that the operator who waits for the case to quiet down before operating will be disappointed.

DR. WILLIAM J. MAYO, Rochester, Minn.: There are a few points to which I wish to call attention. First, duodenal ulcer is more frequent than gastric ulcer; second, although we are told in the text-books of the past that 60 per cent. of gastric and duodenal ulcers occur in women, that the contrary is true; third, if one does a gastroenterostomy for ulcer without proving at the operating table that the ulcer actually exists the operation will probably do the patient harm.

I think that the surgical cure of duodenal and gastric ulcers is certain in at least 80 per cent. of cases, and in 10 per cent. more the patient will be so much benefited as to be well satisfied with the result. Finally, I plead for earlier recognition of cancer of the stomach, and I would emphasize again the fact that a very considerable percentage of cases of cancer of the stomach begin in ulcer. There should be two classes of patients turned over to the surgeon promptly—those with tumor of the stomach and those with obstruction. Why is it that in the great hospitals, cases of cancer of the stomach are found in the medical wards? Can one do any more medicinally in this disease than can be done in cancer of the breast, lip or uterus? A suspicion of cancer makes the case a surgical not a medical one, and the patient should be sent to the surgical side at once.

Again, if a tumor is present, what difference does it make whether that tumor is due to inflammation surrounding a thickened chronic ulcer that is liable to undergo carcinomatous degeneration, or whether cancer actually exists at this time? You will be surprised in some instances at the length of time patients are worked over for a diagnosis with a palpable tumor that, perhaps, they have discovered themselves. Let me say, too, that the moment you make a diagnosis of tumor, no matter what its nature may be, you must consider the case a surgical one, and the surgeon should be called in consultation. I have yet to see the case of mechanical obstruction that can be cured by medical means when it is caused by chronic ulcer. Chronic ulcer producing obstruction can be carried along in various ways, but it can not be cured. When mechanical obstruction is present it is easy to tell by means of the stomach tube. Give the patient raisin cake or some raisins at bedtime. Pass the stomach tube in the morning and see if you can find the skins.

STATE RECIPROCITY IN DENTAL PRACTICE LICENSING.*

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Some wise man has said that no question is ever finally settled until it is settled right. The fight over human slavery went on for generations and even centuries; but the civilized world has come at last to realize that every man is born free and has certain inalienable rights to "life, liberty and the pursuit of happiness." The innate love of fair play which persists in the human heart, even when oppressed and abused, will sooner or later assert itself, and society will come, though by devious ways, to do justice. It is faith in the final righteous verdict of society that inspires confidence in the ultimate success of the effort to secure uniform state laws governing the practice of the dental profession.

* Read in the Section on Stomatology of the American Medical Association, at the Fifty-ninth Annual Session, held at Chicago, June, 1908.

In order to reach a clear understanding of the difficulties which confront any attempt to secure that for which so many of the dental profession are striving, it is necessary to consider the historical development of our form of government. When the thirteen feeble colonies emerged from the exhausting struggle for independence, they were indeed free and independent, not only of foreign powers but also of each other. There was no central head provided by the articles of confederation under which the war for independence was carried on. When peace had come it was seen that there was nobody to regulate commerce with foreign powers, or to make levies on the several states to maintain the credit of the nation. It was because of the absence of this central authority that the constitutional convention was called, issuing in one of the most remarkable documents which the world knows—the Constitution of the United States.

But man is not infallible, and the instrument created by our fathers could not make provision for every contingency that might arise in the development and progress of a people. So it has come to pass that the real union of the states has been an evolution rather than a creation. Just what right inheres in the individual state must be settled as the unfolding life of the nation brings forward one question after another for consideration and settlement. Massachusetts at an early day, and the southern states later on, claimed the right to withdraw from the union, a claim that was only settled at last and forever at the cost of untold sacrifice in money and human lives.

And even now the task of unifying independent states is going on. It is not yet decided what power, state or national, shall be exercised in the final control of our railways. The nation is to-day in a state of transition, but every step that is being taken leads toward the centralization of power. It is this amalgamation of state sovereignty with national control which renders difficult the task of securing uniformity in laws governing the practice of our profession. The states, very justly, are jealous of their rights. They cherish most fondly the right to say what may or may not be done within the confines of the particular commonwealth. They have the authority and purpose to exercise it. Possibly in this tendency an expression of fundamental human nature may be recognized and therefore escape severe blame.

In the discussion of any subject it is necessary, first of all, to state clearly that which is to be considered. The investigator may arrive at this in the present case by asking himself what conditions in the practice of the dental profession need to be remedied, so far as this practice is affected by the division of this country into states. We have long since come to be a nation, but our nationality has not extended its sway over all the activities of all citizens.

A dentist who has practiced successfully for ten years in Illinois may not move into the neighboring state of Wisconsin and continue the practice of his profession without being compelled to undergo an examination before the board of the latter state. His skill, his experience, the reputation which he has established, although it be world-wide, go for nothing. The fact that the examining board in Illinois has testified to his fitness to practice does not count. Perhaps such a state of affairs finds one of its most ridiculous illustrations in the methods which once obtained (and may yet, for all I know to the contrary) in the matter of teachers' certificates in the different counties of a given state. A teacher was